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HIGH-PERFORMANCE BUILDING DESIGN PROFESSIONAL - HBDP EXAM REFRESHER

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ONLINE TRAINING BY KRISHNAJI PAWAR

LEED AP(BD+C), GSAS CGP, GCP, ISO 14001

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MODULE

3

What is Sustainable Development?

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Sustainable development is a holistic approach to meet current needs without compromising future generations' ability to meet their own needs. It involves managing natural resources, social equity, and economic prosperity to ensure long-term environmental, social, and economic sustainability.

Learning Objectives

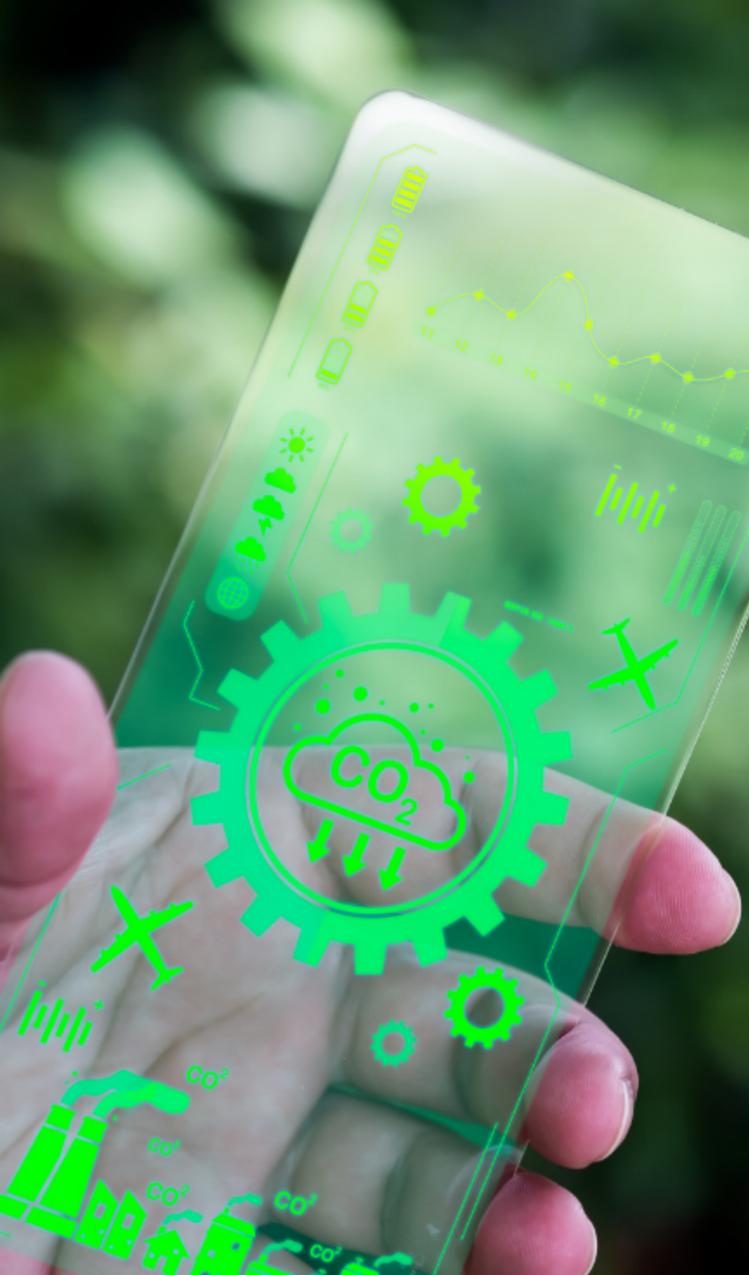
- Introduction to High Performance Buildings
- Sustainability Concepts
- **What is sustainable development?**
- Sustainable Development: Definitions and Applications
- Sustainable Buildings
- Sustainable Transportation
- Alternative Energy & Carbon Reduction
- Environmental Improvement Programs and Rating Systems
- HVAC Processes



INTRODUCTION

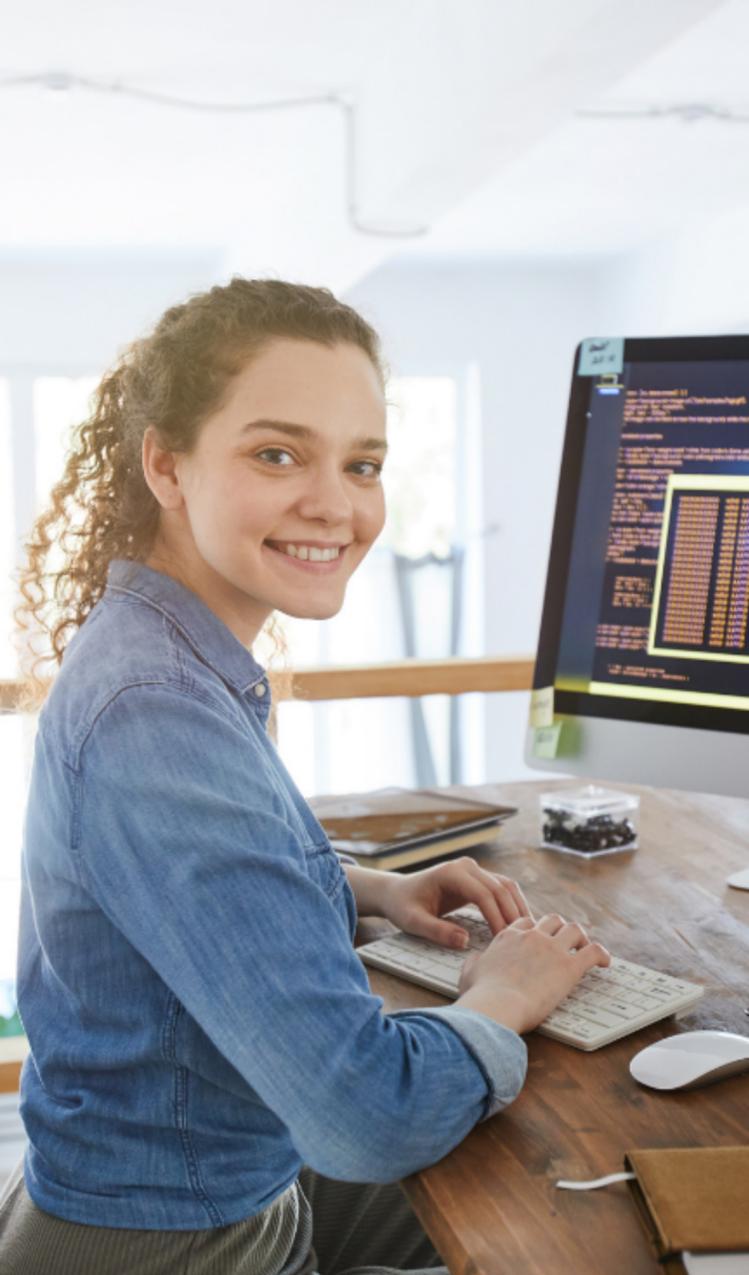
- Sustainable development aims to meet current needs without compromising future generations' ability to meet their own needs.
- It involves managing natural resources, social equity, and economic prosperity for long-term sustainability.
- A three-legged stool represents environmental, social, and economic aspects of sustainability.
- Renewable energy sources like solar or wind power reduce reliance on finite resources, protecting the environment for future generations.
- Sustainable agriculture practices like crop rotation and organic farming maintain soil fertility, reduce harmful pesticides and fertilizers, and protect biodiversity.
- Sustainable development is a holistic approach to meet societal needs while preserving the environment for future generations.

WHAT ARE SUSTAINABLE DEVELOPMENT AND SUSTAINABILITY?



- Sustainable development and sustainability are theoretical constructs with varying implications.
- Sustainability is a set of policies, programs, and initiatives with unique implications.
- The concept of sustainability is not a universal solution to global problems.
- Factors contributing to sustainability include social issues, economic concerns, resource allocation, environmental damage, population growth, access to potable water, health, and energy usage.

UNDERSTANDING SUSTAINABLE DEVELOPMENT



- Is sustainable development a policy, collection of policies, or management approach?
- Is it a mental philosophy, agenda, or new set of problems?
- How did the sustainability agenda evolve?
- Can sustainability be defined and quantified?
- What solutions does it offer?
- Is sustainability worth pursuing?

A hand holding a glowing lightbulb, symbolizing an idea or innovation. The lightbulb is surrounded by several white gears of various sizes, some of which contain icons like a lightbulb, a wrench and pencil, and a globe. The background is a blurred cityscape at night, overlaid with a network diagram of white lines and dots, suggesting a smart city or digital infrastructure.

HOW SUSTAINABILITY EVOLVED

EVOLUTION OF SUSTAINABILITY

- Forces responsible for sustainability include social issues, economic concerns, resource allocation, environmental damage, population growth, access to potable water, health, and energy usage.
- Sustainable development is a priority of a new world agenda.
- Examines causes and effects of global problems like urban development, population growth, and energy use.
- Examines the nature and scope of policies supporting sustainable development.





MAJOR UNDERLYING CAUSE:

- POPULATION GROWTH
- A SECOND MAJOR UNDERLYING CAUSE: URBAN DEVELOPMENT
- A THIRD UNDERLYING CAUSE: INCREASING ENERGY USAGE



ENERGY: SOCIETY'S MOST CRITICAL RESOURCE

POPULATION GROWTH

- Population growth, with the world's population more than doubled in the past 50 years, has increased consumption of resources, contributing to environmental degradation and climate change.
- Sustainable practices must be integrated to address challenges posed by population growth, including promoting renewable energy, water conservation, biodiversity protection, and waste reduction.
- Education and awareness are essential to foster a culture of sustainability and encourage responsible consumption and production.
- Prioritizing sustainable practices is crucial for a healthy planet for current and future generations.



URBAN DEVELOPMENT



- Urban development refers to the growth and expansion of cities through the construction of buildings, roads, and infrastructure.
- It is driven by factors such as population growth, economic development, and changes in land use patterns.
- Urban development contributes to environmental degradation through the loss of natural habitats, leading to ecosystem destruction and displacement of wildlife.
- Urban development also leads to increased pollution and waste generation due to the demand for resources like water, energy, and raw materials.
- Urban development can exacerbate climate change by releasing greenhouse gases, contributing to global warming and causing environmental changes.
- Policymakers, planners, and developers should consider the environmental consequences of urban growth and implement sustainable practices to mitigate these impacts.

INCREASING ENERGY USAGE

- Population growth: Increased population necessitates more energy for powering homes, schools, and businesses.
- Technological advancements: New technologies like electric vehicles and electronic devices require more energy for efficient operation.
- Industrialization: As industries expand and modernize, their energy requirements also increase.
- Lifestyle changes: Increased travel, air conditioning, and electronic devices increase energy consumption and usage.
- Solutions: Countries may need to increase energy production and distribution capabilities, build new power plants, expand renewable energy sources, and improve energy efficiency.
- Balancing benefits with environmental and social impacts is crucial.
- Sustainable ways to meet energy demand while minimizing negative consequences are essential.



ENERGY: SOCIETY'S MOST CRITICAL RESOURCE



- Energy production is centralized, while energy utilization is decentralized.
- External costs include environmental and air pollution, cap-financial accessibility, and social fairness.
- Companies are increasingly absorbing these costs due to circumstances.
- Energy-efficient use can greatly benefit the built environment.
- This includes supporting urban growth while minimizing environmental impact and avoiding the need for new power plants.
- Technologies are available for more efficient energy use.
- The global energy production and transmission efficiency index shows a 70% recovery rate, indicating potential for further energy efficiency advancements.



ENERGY: SOCIETY'S MOST CRITICAL RESOURCE

Sources of Energy

- Fossil Fuels: Non-renewable resources from ancient organic matter, primary energy source for many countries.
- Renewable Energy: Natural, replenishable sources like solar, wind, hydroelectric, and geothermal energy.
- Nuclear Energy: Controversial due to safety and waste disposal concerns.



Energy Consumption

- Rapid increase in energy demand due to societal growth and development.
- Need to reduce energy consumption and transition to cleaner, more sustainable energy sources.

Conclusion

- Energy is society's most critical resource, enabling comfortable and productive lives.
- Prioritizing energy efficiency, conservation, and renewable energy development is crucial for a sustainable future.

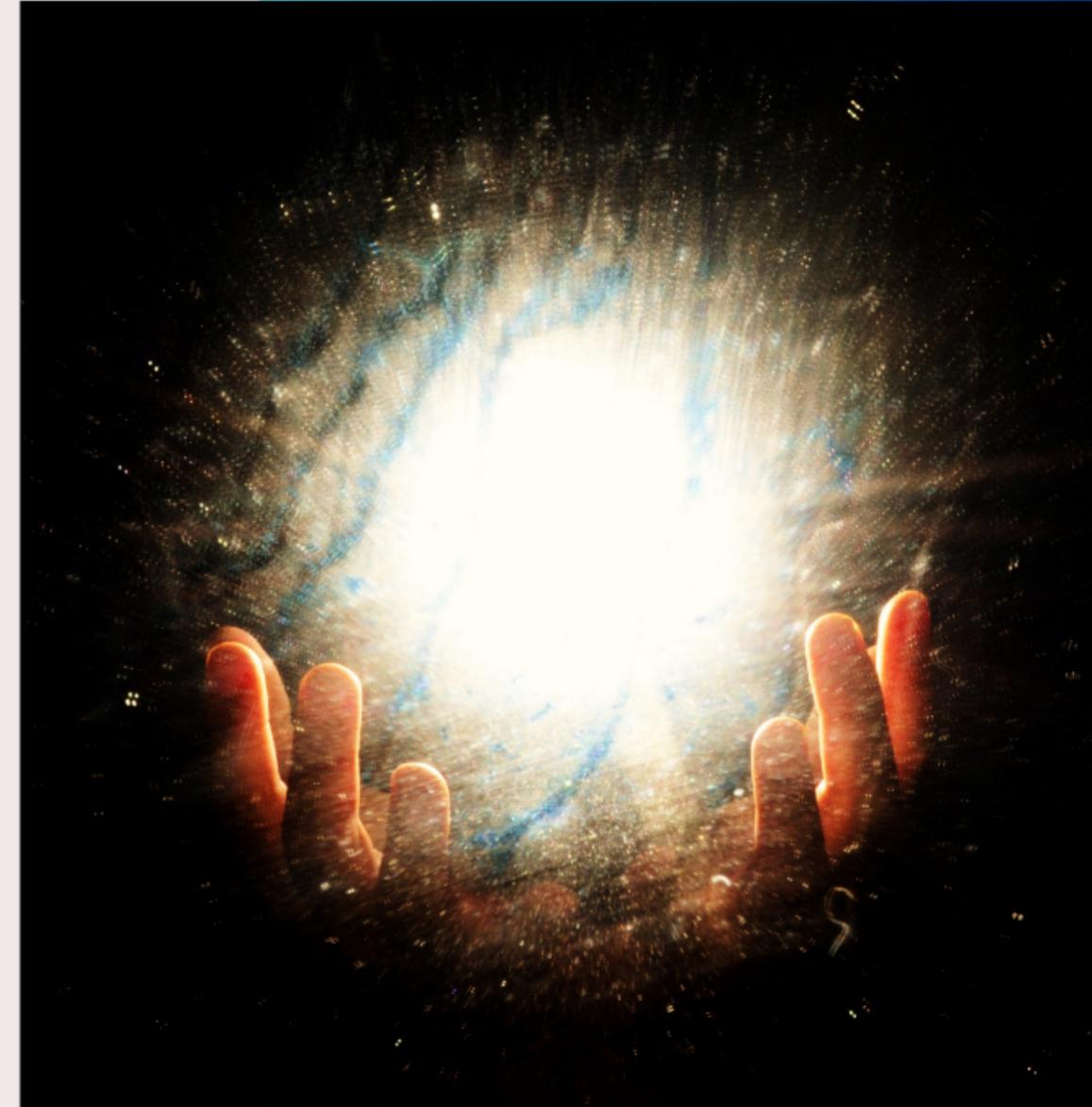
TECHNICAL SOLUTIONS:
READY, NOW!

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ENVIRONMENTAL DETERIORATION

- Environmental deterioration is the decline in environmental quality due to human activities and natural processes.
- Pollution, including air, water, and soil pollution, harms wildlife and contaminates ecosystems.
- Deforestation leads to habitat loss, soil erosion, and increased greenhouse gas emissions, disrupting ecosystems and potentially causing species extinction.
- Climate change, caused by burning fossil fuels, increases greenhouse gas emissions and global temperatures, causing more frequent and severe weather events.
- Overexploitation of natural resources like fishing, mining, and deforestation leads to rapid resource depletion, causing loss of biodiversity and ecosystem services.
- Sustainable practices, such as using clean technologies, conservation efforts, and transitioning to renewable energy, can combat environmental deterioration.



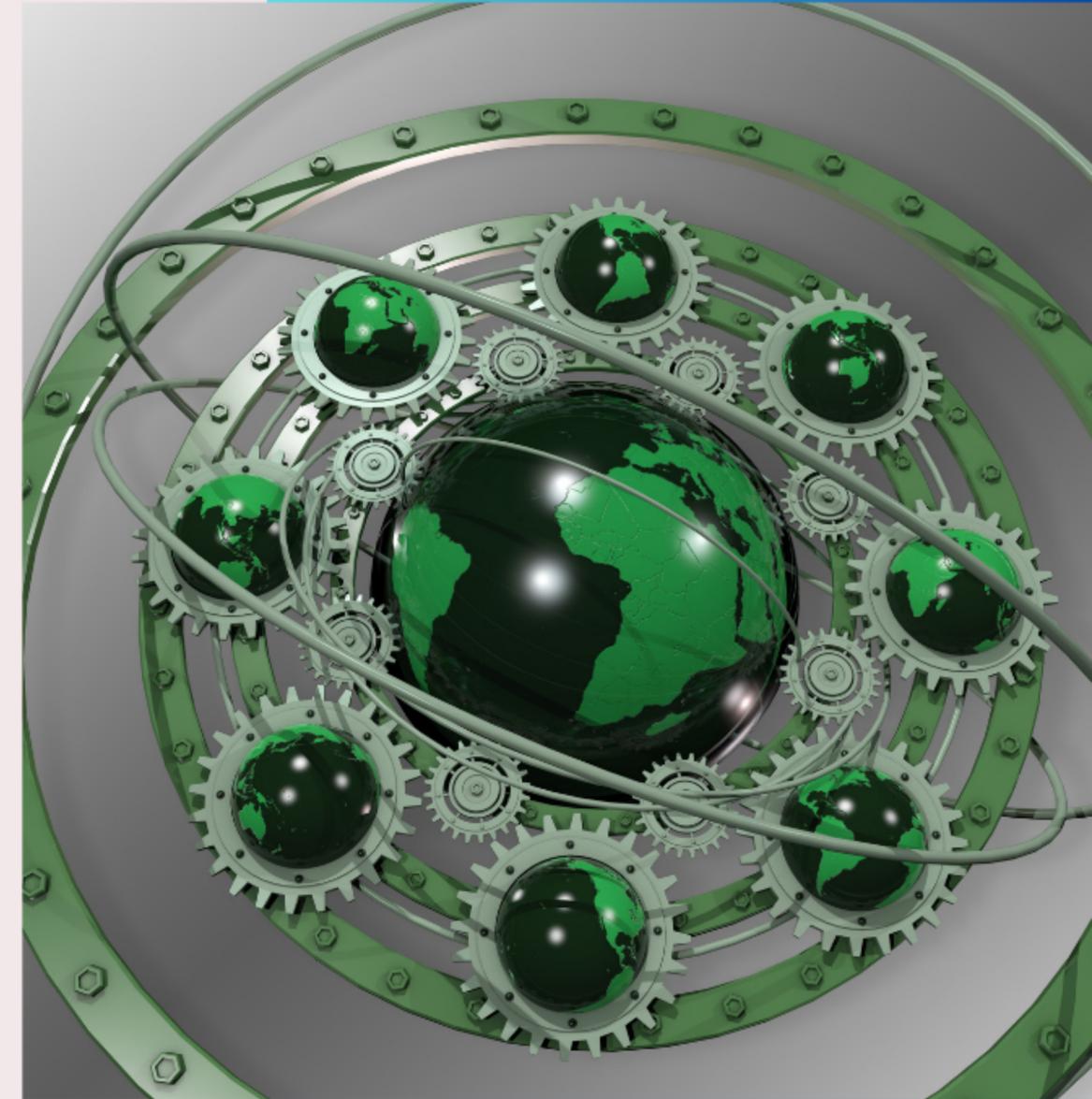
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URBAN DISLOCATION

- Refers to displacement or uprooting of individuals, families, and communities from urban areas.
- Factors include gentrification, urban renewal projects, natural disasters, and economic downturns.
- Gentrification: Wealthier individuals or businesses move into lower-income neighborhoods, increasing property values and rents.
- Urban renewal projects: Demolishing or renovating older buildings or neighborhoods can displace residents and businesses.
- Natural disasters: Force evacuations due to safety concerns or property destruction.
- Economic downturns: Rising job loss and foreclosure rates lead to increased homelessness and instability.



URBAN INFRASTRUCTURE CHANGES AND RAPID URBANIZATION

- Urban infrastructure refers to the physical systems and structures supporting city functioning, including transportation networks, utilities, communication systems, and public services.
- Rapid urbanization strains existing infrastructure, leading to overcrowded transportation systems, inadequate water and sanitation facilities, and insufficient public services.
- Cities like Mumbai, India, have experienced congestion due to the influx of migrants, and water and sanitation systems struggle to keep up with the growing population.





URBAN INFRASTRUCTURE CHANGES AND RAPID URBANIZATION +



- To address these challenges, cities must invest in upgrading and expanding their infrastructure, including building new roads, improving water and sanitation facilities, and expanding access to essential services.
- Cities are likened to living organisms, needing efficient transportation networks to connect residents to jobs, schools, and essential services.
- Failure to invest in urban infrastructure can lead to congestion, shortages, and other challenges hindering city development.

SUSTAINABILITY, ENERGY, AND CITIES: A HOLISTIC APPROACH

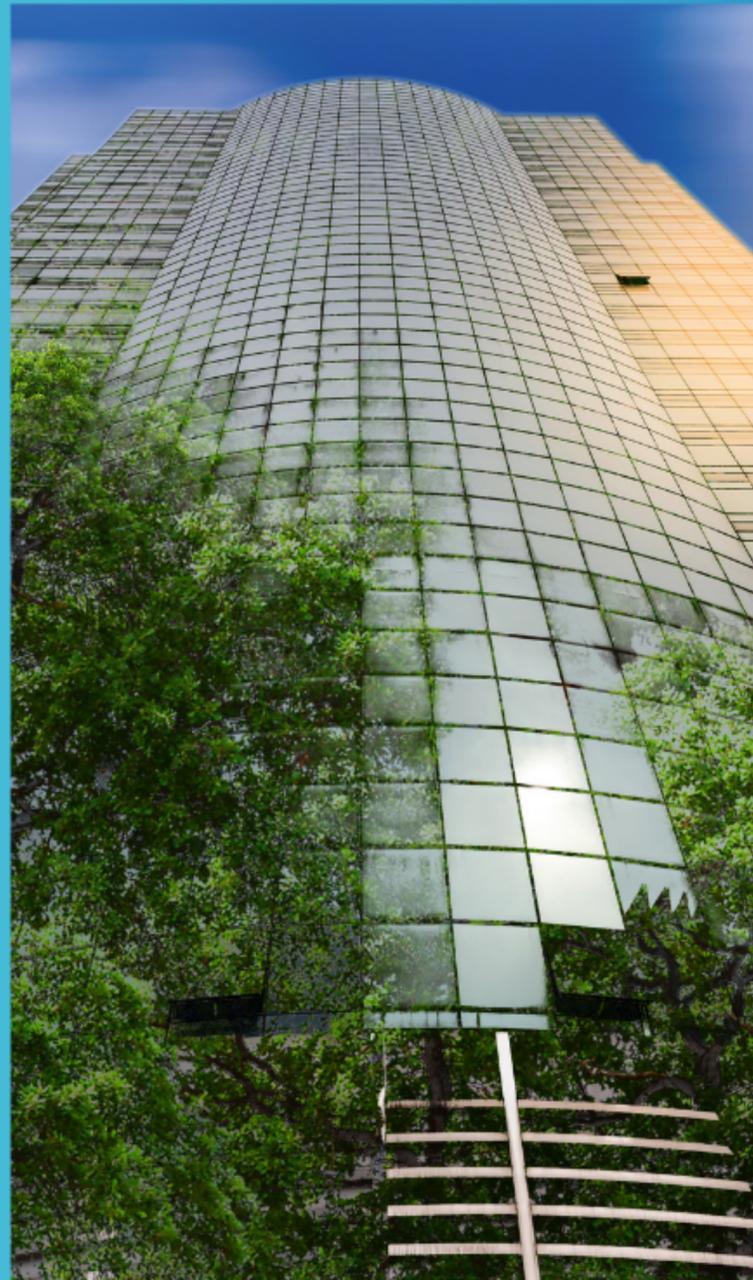
- Sustainability involves meeting present needs without compromising future generations' ability to meet their own needs.
- Cities are crucial due to their high concentration of people and resources, leading to significant global energy consumption, greenhouse gas emissions, and waste generation.
- Energy efficiency is key in urban sustainability, reducing carbon footprint and lowering energy costs through retrofitting buildings with energy-efficient systems.
- Renewable energy sources like solar panels, wind turbines, and hydropower plants can generate clean energy without depleting finite resources or contributing to climate change.





SUSTAINABILITY, ENERGY, AND CITIES: A HOLISTIC APPROACH +

- Sustainable cities prioritize waste management, water conservation, green spaces, and public transportation.
- A holistic approach to sustainability, energy, and cities can enhance resilience, efficiency, and livability, while safeguarding the well-being of current and future generations.



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THANK YOU

